sion of his countenance, a striking resemblance to an engraving of a piece of sculpture, found near Palenque in Central America, to which Dr. Bowditch had previously called the attention of the Academy.

Three hundred and fortieth meeting.

December 3, 1850. — MONTHLY MEETING.

The PRESIDENT in the chair.

Mr. Everett, chairman of the committee appointed at the last monthly meeting to address a letter on the subject of sustaining the Toronto Observatory, either to the American Minister or the Royal Society, as they should deem most expedient, stated that the committee had addressed a letter to the Royal Society, recommending the continuance of the meteorological and magnetical observations at the Toronto Observatory, for another period of three years.

Dr. Pierson exhibited to the Academy a large and valuable specimen of gold recently brought from California.

Mr. Alger exhibited several very remarkable crystals of gold from California, and offered the following remarks in illustration of them: —

"The largest were octahedral crystals, simple or modified, and were as perfectly formed as similar crystals of pleisto-magnetic iron, or octahedral spindle. The most striking examples were three isolated crystals, which without exhibited no portion of the usually adhering quartz matrix. Their exact locality was not known, but the very worn appearance presented by several of them indicated their erratic or transported origin. The largest was *three fourths of an inch* across the base, and the smallest one quarter of an inch. This last presents four regular faces, with three of its solid angles extending out to points, which, however, have become somewhat rounded by attrition. It exhibits no modifications; but two of its faces are depressed or hollowed out, one of them by a very deep cavity, which extends not quite to the edges of the planes, but so near to them as to leave a narrow ridge or border all around the cavity, and parallel with its edges; thus giving

the same triangular outline to each. It appeared as if the crystal had been in a melted state, and that, soon after the outside had congealed, the inner and yet fluid portion, or a part of it, had run out, leaving the surrounding consolidated edge just referred to. Appearances quite similar may sometimes be observed among artificial crystals, as for instance alum, and, more strikingly, metallic lead (which takes the form of the octahedron and has become partially desulphurized), in cases where the metal was allowed to flow off slowly, just as the outer crust had formed over the surface of the crystals. The large crystal presents only one half of the octahedron, its base blending with the massive gold, or only indicating the incipient planes of the lower pyramid. Three of its planes are perfectly smooth, excepting along the edges, which are prominently marked by the same projecting border or ridge observed on the smaller crystal. This border may have been produced in the same manner by the shrinking away of the metal, or it may be the result of that kind of crystallization which is dependent on a greater intensity of molecular attraction in one direction or axis than another. It would seem in this case as if the molecules arrived at the points of contact along the edges of the crystal faster than they could be appropriated, and thus have accumulated in these little ridges. This peculiarity is not confined to the large crystals, for it is observed even among the smallest. In one instance, as shown on a crystal of a half-inch in diameter, there had been produced a double series of these parallel ridges, extending around the edges of one of the planes of the octahedron, the inner ridge representing, apparently, the commencement of another crystalline face within the cavity of the larger one.*

"The great size of these crystals, and the fact that some of the cavi-

* The two large crystals above described were obtained from the very choice and beautiful collection of specimens, made with great care, and at no small expense, by Mr. Platt. This gentleman, during a most prosperous residence of two years in San Francisco, and while occupying a situation which brought him into daily and almost hourly contact with persons returning from the mines, has evinced his good taste by purchasing the most interesting specimens obtained by them. He has consequently been rewarded by the finest amateur collection hitherto brought from California. It comprises a great variety of ramified, arborescent, dendritic, and other imitative forms, here and there showing crystalline faces, all of them being sometimes most fantastically joined together in the same specimen. He informs me that, in obtaining this collection, he had examined gold of the value of more than four millions of dollars.

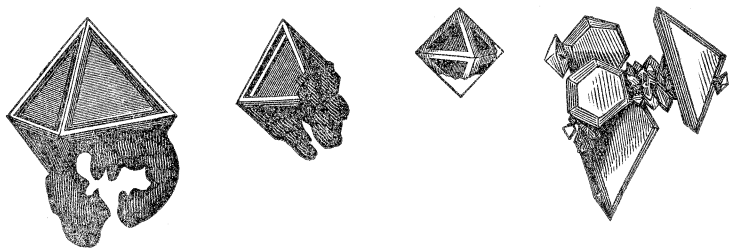
ties contained portions of oxide of iron, probably derived from the decomposition of iron pyrites, have led some to regard them as pseudomorphs of sulphuret of iron. But there seems to be no good reason for ascribing any such forced and unnatural origin to these beautiful productions. On the contrary, they seem to have been formed under the ordinary circumstances of crystallization, either in open space, or while surrounded by a matrix so soft and accommodating, as to allow them full freedom to take the form it was intended they should take. Were the crystals cubes, there might be some reason for regarding them in the light of pseudomorphs of iron pyrites, because this is the most common form of pyrites, and, moreover, all the pyrites hitherto brought from California have been in that form. But, we may well ask, who has ever seen even a cubic pseudomorph of gold ? Crystals of gold are rare, cubes particularly so, and yet this form, on account of its simplicity, is made the primary form ; whereas it would seem as reasonable, in cases of the regular system, to select that form as the primary which is most commonly and perfectly presented by the mineral, provided there is no cleavage to guide us in the determination ; and there does not appear to be any, well made out, among most of the native metals. By assuming those which most commonly occur in nature, we seem to recognize a sort of inherent disposition, a preference, as it were, which is shown by the mineral itself; and we avoid what seems to be a palpable inconsistency, namely, the establishing of a cube as the primary form of minerals which have never been known to occur under such form, and which even present a distinct octahedral cleavage. This is the case with two at least. If we take the simplest form, the cube should be made the primary of native iron, copper, lead, silver, and mercury ; and so of some others, which occur in octahedrons and are not determined by any certain cleavage. In the case of copper, some authors have made the cube its primary.* Haüy (*Traité*, 1808) even expressed his doubts as to the existence of cubic gold, while he cites examples of the octahedron ; and Beudant (*Min.*, 1832) says they are very rare.† Mohs implies the contrary, for he says (*Min.*, ed.

* They differ in regard to silver and iron, some adopting the cube, and others the octahedron, as the primary.

† Cronstedt, in his Mineralogy, says, "I have procured in Transylvania a specimen of cubic native gold, but I have never seen it anywhere else." In Levy's enumeration of the splendid Turner collection formed by Henry Heuland, eight examples are given of the regular octahedron, and only two of the cube, one of these being from the very locality Cronstedt speaks of.

by Haidinger) they are often hollow, while the octahedrons are smooth. Cleaveland describes the crystals in general as small and imperfect, and Nichol, in his late work, in like manner, observes, 'They are small, and very small.' It is more than probable that we may yet be able to say of our California gold crystals, they are large, and very large, as much for the benefit of mineralogists, as for a reward to the industry and hard toil of the diggers.

"The first three of the following figures give a pretty correct idea



of the size and appearance of the specimens above referred to. The fourth is a group of rare modified forms or hemitrope combinations, such as have occasionally been brought from Brazil and Siberia. There is an example somewhat similar to it in the School of Mines (Paris), and described by M. Dufrénoy in his late treatise on Mineralogy. The crystals exhibited have been very fully described in the *American Journal of Science*, Vol. X., 1850.

Two additional crystals recently received present still more remarkable modifications, one of them being a hemitrope. Some description of these will be given at another meeting of the Academy."

Dr. C. T. Jackson added some remarks on the beautiful crystals of native gold from California, exhibited by Mr. Alger, and stated that crystals of this magnitude were unknown in the public collections of Europe, where those of one eighth of an inch in diameter were regarded as very rare and valuable specimens. He also observed, that the octahedral crystals belonging to Mr. Alger appeared like what are called dissected crystals, the centres of the triangular planes of the octahedron being depressed, while the edges were presented in bold relief, and a series of striæ, parallel to the edges of the planes, indicated a remarkable decrement

from those edges towards the centre of the planes, such as is exhibited in crystals of alum partially dissolved by elevation of the temperature of the mother solution in which the crystals were originally formed.

He stated that he had examined and assayed some remarkable specimens of native gold from California, one single mass examined by him weighing 265 ounces, and containing 235 ounces of California gold, or 200 ounces of fine gold, and 35 ounces of silver. This single specimen is worth $3,885, and is the largest that has been brought from California to this city.

Dr. J. C. Warren exhibited to the Academy some large and valuable casts of fossils from the Sivâlik Hills, situated in the northern part of Hindostan, which he described and remarked upon at considerable length.

Mr. J. D. Whitney gave an account of the progress of the geological survey of the United States mineral lands in Michigan, and of its results; and exhibited several geological maps of that region executed for the United States.

Three hundred and forty-first meeting.

January 7, 1851. — MONTHLY MEETING.

The PRESIDENT in the chair.

Professor Peirce made some remarks respecting the uncertainty existing in regard to the masses of the planets. They vary when determined by different satellites, and should be taken as determined by actions upon planets, rather than upon satellites. The observations of Mr. Bond upon the satellite of Neptune give a less mass to that planet than those of the Pulkova Observatory, or those of Mr. Lassell; but the accuracy of Mr. Bond's observations is confirmed by the perturbations of Uranus. Professor Peirce stated the amount of discrepancy, as to the masses of several of the planets, between observation and theory. He said that theoretical errors could sometimes